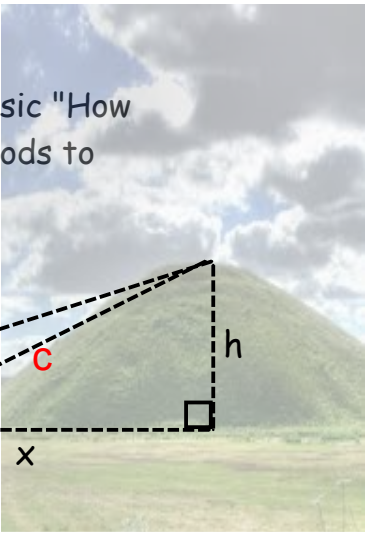
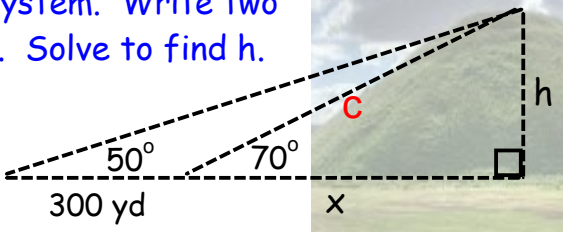
Precalc Warm Up # 11-3

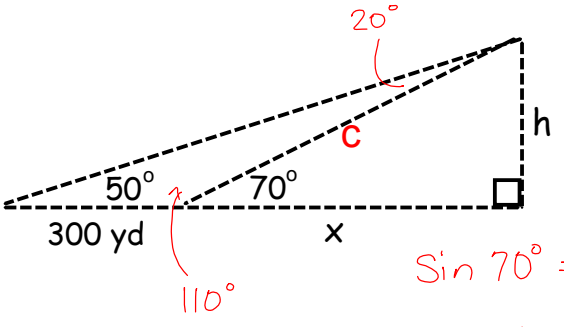
We now have two ways of solving the classic "How tall is the hill ?" problem. Use both methods to find h.



1. Old way: with a system. Write two equations in x and h. Solve to find h.



2. New way: Solve for c using Law of Sines with the triangle on the left. Then find h with right triangle trig.



$\frac{c}{\sin 50^\circ} = \frac{300}{\sin 20^\circ}$

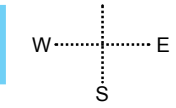
$c = \frac{300 \sin 50^\circ}{\sin 20^\circ}$

$\sin 70^\circ = \frac{h}{c}$

$h = c \sin 70^\circ$

$h \approx 631.4$ yds.

EXERCISES 9.5.3



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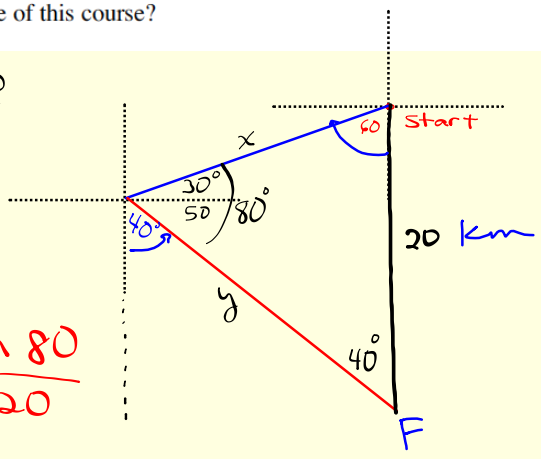
1. A short course biathlon meet requires the competitors to run in the direction S60°W to their bikes and then ride S40°E to the finish line, situated 20 km due South of the starting point. What is the distance of this course?

$\frac{\sin 40}{x} = \frac{\sin 80}{20}$

$x = \frac{20 \sin 40}{\sin 80}$

$x \approx$



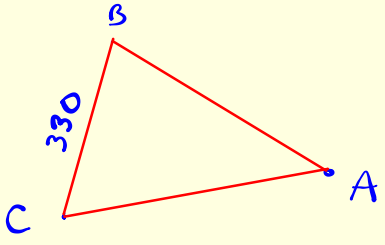
$\frac{\sin 60}{y} = \frac{\sin 80}{20}$

$y = \frac{20 \sin 60}{\sin 80}$

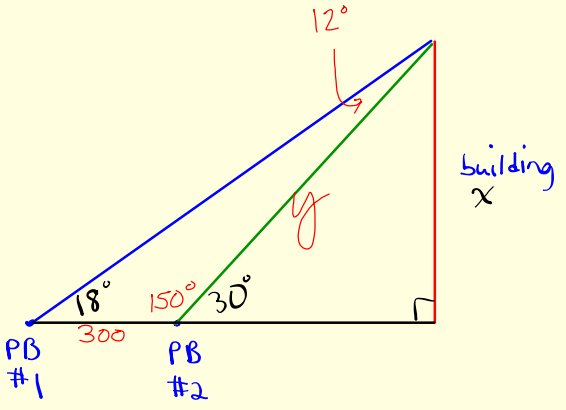
$y \approx$

just add x + y = ☐

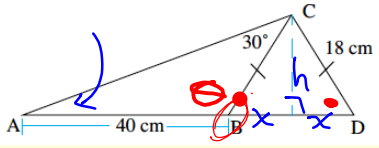
3. A statue A, is observed from two other statues B and C which are 330 m apart. The angle between the lines of sight AB and BC is 63° and the angle between the lines of sight AC and CB is 75°. How far is statue A from statue B?



5. The angle of elevation of the top of a building from a park bench on level ground is 18°. The angle of elevation from a second park bench, 300 m closer to the base of the building is 30°. Assuming that the two benches and the building all lie on the same vertical plane, find the height of the building.



9. The framework for an experimental design for a kite is shown. Material for the kite costs $12 per square cm. How much will it cost for the material if it is to cover the framework of the kite.



$A(\$12) = \text{cost}$

$\frac{\text{cm}^2}{} \quad \frac{\$12}{\text{cm}^2}$

$A = \frac{1}{2}(40 + 2x)h$

$\frac{\sin A}{18} = \frac{\sin 30^\circ}{40} \cdot 18 \quad \frac{9}{20}$

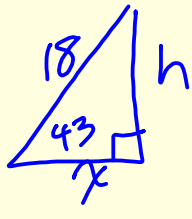
$13 + 30 + \theta = 180$

$B + \theta = 180$

$\sin A = \frac{1}{2}\frac{9}{20}$

$A = \sin^{-1}\left(\frac{9}{40}\right)$

$A \approx 13.0^\circ$



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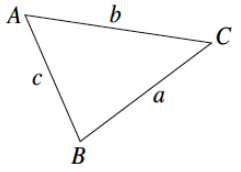
EXERCISES 9.5.1

Use the sine rule to complete the following table, which refers to the standard labelling of a triangle.

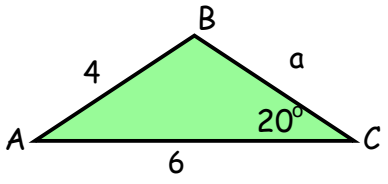


	a cm	b cm	c cm	A	B	C
1.			48.2		29°	141°
3.			11.3	60°		117°
5.	18.5	11.4		68°		
7.		7.3			16°	85°
9.	0.8		0.8	82°		
11.	16.4			52°	84°	

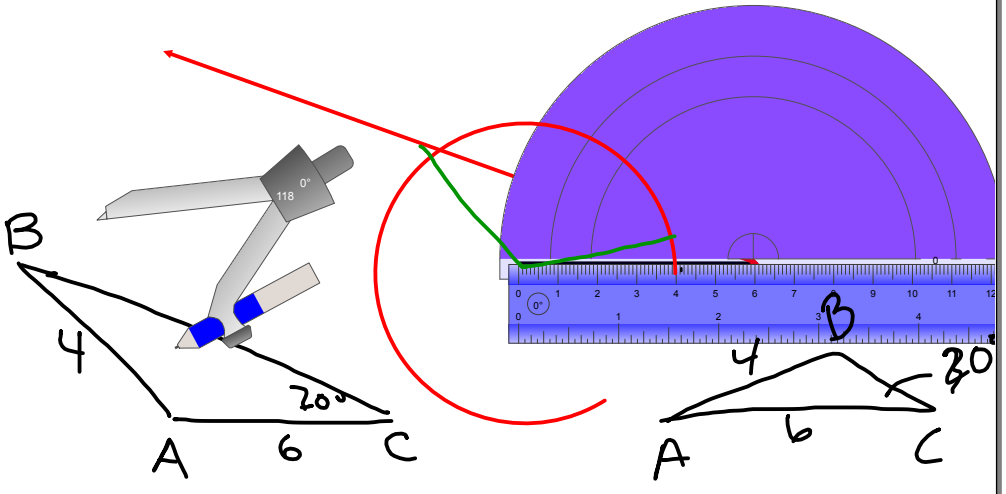
The Law Of Sines solves ASA and AAS cases.
AAA can't be solved.
SSS and SAS need Law of Cosines.

Today we will concentrate on the
ambiguous case: SSA

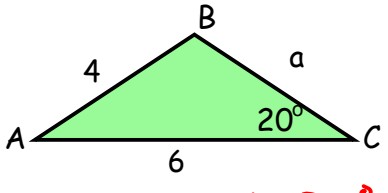
Construct Triangle ABC. Then Solve it.



4, 6, 20°



Construct Triangle ABC. Then Solve it.



$A \approx 129.1°$ $A \approx$

$B \approx 30.9°$ $B \approx 149.1°$

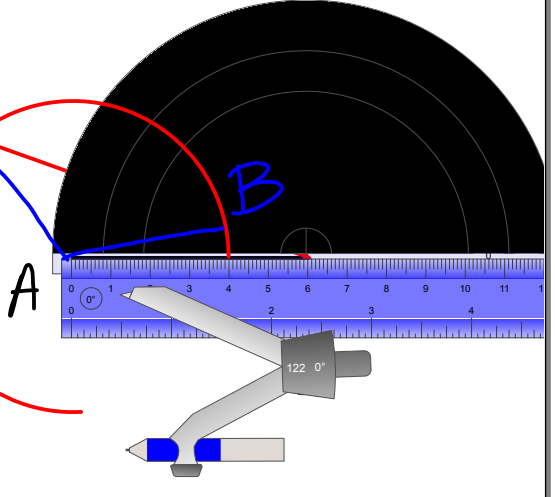
$a \approx$ $a \approx$

$\frac{\sin B}{6} = \frac{\sin 20°}{4}$

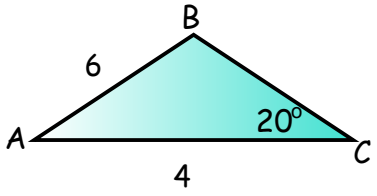
$B = \sin^{-1}\left(\frac{6 \sin 20°}{4}\right)$

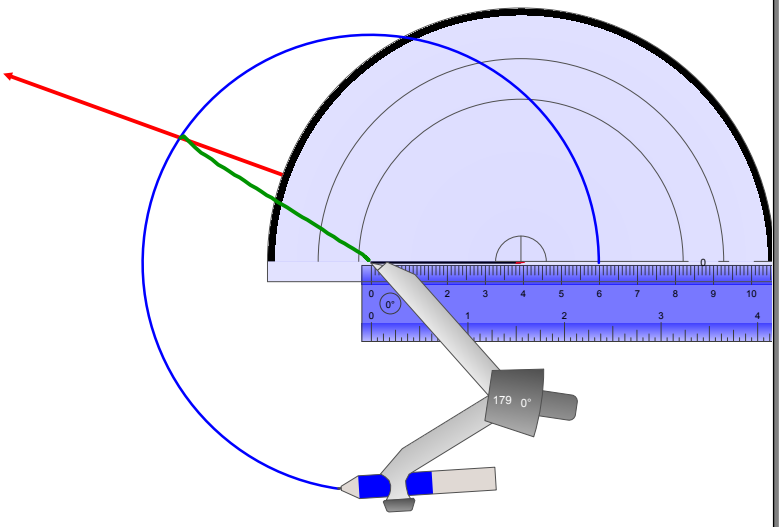
$B \approx 30.9°$

STO → B



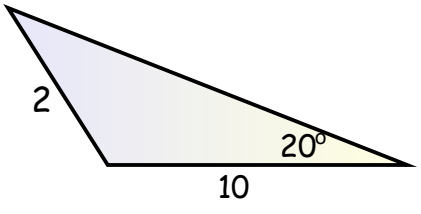
Switch the 4 and 6 around, and construct this triangle.

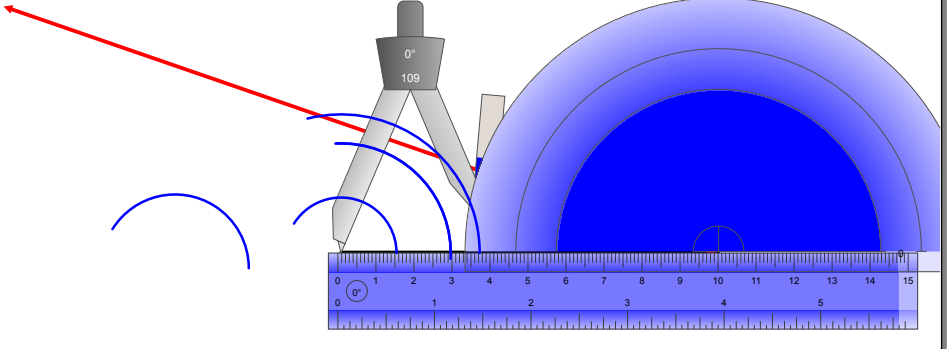




Construct and Solve the SSA triangle below

2, 10, 20°





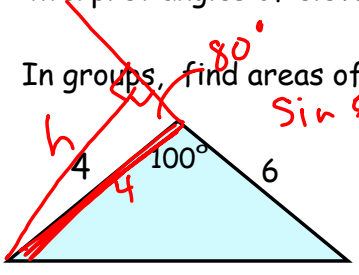
On page 295 in SL book, there is a summary of how many triangles you can draw for the SSA case -- 0, 1, or 2.

You can often figure it out with a quick sketch. If you're not sure, just try finding a second set of answers.

You will know quickly if there is 0, 1, or 2 answers by considering if what you are getting makes sense for a triangle.

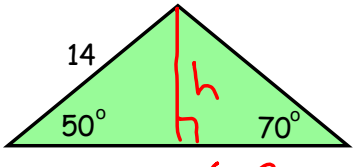
So far, we should be able to solve any of these triangles. We also should be confident solving bearing problems, and how to interpret angles of elevation and depression.

In groups, find areas of these non right triangles.

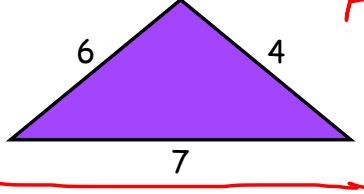


$\sin 80 = \frac{h}{4}$

$A \approx 11.8$



$A \approx 69.2$



$A \approx$ 12.0

$A = \sqrt{s(s-a)(s-b)(s-c)}$

HW:

SL p. 298 #2-10 even,

and p. 297 #1-3

Group Test, next week

(Triangle Solve)